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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,089	04/19/2004	James Wagner Larsen	14088/299978	1884

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EXAMINER	
LE, TOAN M	

ART UNIT	PAPER NUMBER
2863	

DATE MAILED: 09/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/827,089	LARSEN, JAMES WAGNER	
	Examiner	Art Unit	
	Toan M Le	2863	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-9 and 11-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1* is/are allowed.

6)☒ Claim(s) *3,4,7-9,11,13 and 14* is/are rejected.

7)☒ Claim(s) *5,6 and 12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 April 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/25/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 3-4, 7-9, and 13-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Johnson (US Patent No. 4,868,504).

Referring to claim 3, Johnson discloses an apparatus for determining presence of an object, comprising:

a. an emitter adapted to produce and propagate a time varying primary electromagnetic field (col. 3, lines 18-28, figure 1; col. 4, lines 39-54, figure 3);

b. at least one sensor, the sensor adapted to receive a secondary electromagnetic field, the secondary electromagnetic field produced by the object as a function of the primary electromagnetic field (col. 3, lines 28-30);

c. the sensor coupled to a receiver, the receiver adapted to determine difference in phase between the primary electromagnetic field and the secondary electromagnetic field and to provide information corresponding to identification of the material forming the object as a function of the phase differences (col. 5, lines 19-59); and

d. in which the primary electromagnetic field contains at least one code and the at least one sensor uses the code of the primary electromagnetic field to determine the phase differences (col. 6, lines 26-65).

As to claim 4, Johnson discloses an apparatus for determining presence of an object in which the at least one sensor is adapted to determine amplitude of the secondary electromagnetic field and to provide information corresponding to distance of the object to the at least one sensor (col. 5, lines 60-66).

Referring to claim 7, Johnson discloses an apparatus for determining presence of an object in which the at least one sensor is adapted to provide information corresponding to identification of material forming the object based at least in part on determining from the phase differences information relating to conductivity and permeability of the material (col. 5, lines 35-59).

As to claim 8, Johnson discloses an apparatus for determining presence of an object in which the emitter is adapted to emit, and the at least one sensor is adapted to sense, a plurality of primary electromagnetic fields, at least some of the fields varying in at least one property from other of the fields (col. 5, lines 19-34).

Referring to claim 9, Johnson discloses an apparatus for determining presence of an object, comprising:

a. an emitter adapted to produce and propagate a time varying primary electromagnetic field (col. 3, lines 18-28, figure 1; col. 4, lines 39-54, figure 3);

b. at least one sensor, the sensor adapted to receive a secondary electromagnetic field, the secondary electromagnetic field produced by the object as a function of the primary electromagnetic field (col. 3, lines 28-30);

c. the sensor coupled to a receiver, the receiver adapted to determine difference in phase between the primary electromagnetic field and the secondary electromagnetic field and to

provide information corresponding to identification of the material forming the object as a function of the phase differences (col. 5, lines 19-59); and

d. in which the at least one sensor determines the phase differences using a clock that is also used by the emitter (col. 6, lines 26-33).

As to claim 13, Johnson discloses an apparatus for determining presence of an object, comprising:

a. an emitter adapted to produce and propagate a time varying primary electromagnetic field (col. 3, lines 18-28, figure 1; col. 4, lines 39-54, figure 3);

b. at least one sensor, the sensor adapted to receive a secondary electromagnetic field, the secondary electromagnetic field produced by the object as a function of the primary electromagnetic field (col. 3, lines 28-30);

c. the sensor coupled to a receiver, the receiver adapted to determine difference in phase between the primary electromagnetic field and the secondary electromagnetic field and to provide information corresponding to identification of the material forming the object as a function of the phase differences (col. 5, lines 19-59); and

d. in which the emitter includes a resonant power circuit in order to produce the primary electromagnetic field (col. 5, lines 4-15).

Referring to claim 14, Johnson discloses an apparatus for determining presence of an object further comprising at least one nulling emitter adapted to produce and propagate a nulling electromagnetic field in order to reduce effects of the primary electromagnetic field on the at least one sensor (col. 1, lines 54-59).

Claim 11 is rejected under 35 U.S.C. 102(b) as being anticipated by Michiguchi et al. (US Patent No. 4,706,031).

Referring to claim 11, Michiguchi et al. discloses an apparatus for determining presence of an object (col. 22, lines 66-67; figure 4), comprising:

a. an emitter adapted to produce and propagate a time varying primary electromagnetic field (col. 9, lines 7-18; col. 22, line 68);

b. at least one sensor, the sensor adapted to receive a secondary electromagnetic field, the secondary electromagnetic field produced by the object as a function of the primary electromagnetic field (col. 9, lines 18-22; col. 23, lines 1-3);

c. the sensor coupled to a receiver, the receiver adapted to determine difference in phase between the primary electromagnetic field and the secondary electromagnetic field and to provide information corresponding to identification of the material forming the object as a function of the phase differences (col. 23, lines 4-13); and

d. in which the emitter is adapted to pulse width modulate the primary electromagnetic field (col. 9, lines 52-56).

Allowable Subject Matter

Claims 5-6 are objected to as being dependent upon a rejected base claims 3-4, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The reason for allowance of the claims 5-6 is the inclusion of sensing gradient in the secondary electromagnetic field by at least two sensors to provide information relating to direction and distance of the object from at least one of the sensors.

Claim 12 is objected to as being dependent upon a rejected base claim 11, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The reason for allowance of claim 12 is the inclusion of switched capacitors in order to pulse width modulate the primary electromagnetic field.

Claim 1 is allowed.

The reason for allowance of claim 1 is the inclusion of the active subsystem including a plurality of sensors is adapted to shape the transmitted field in the vicinity of the sensors in order to reduce the sensors' sensitivity to the transmitted field and to desensitize the sensors to movement with respect to the active subsystem.

The closest reference 4,868,504 teaches a transmitter coil and receiver coil are mounted on opposite ends to produce a null signal in the receiver circuit.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 4,072,942 to Alongi U.S. Patent No. 5,576,627 to McEwan

U.S. Patent No. 6,211,807 to Wilkison U.S. Patent No. 6,362,737 to Rodgers et al.

"Use of Superconductive Gradiometer in an Ultrasensitive Electromagnetic Metal Detector", Czipott et al., IEEE Transactions on Magnetics, Vol. 25, No. 2, March 1989, Pages 1204-1207

"Usage of Millimeter Waves in On-Board Radar for Detection of Objects on Small Depth in Ground", Bakhvalov et al., 2000 IEEE, Pages 432-434

"Electromagnetic Imaging of Underground Targets Using Constrained Optimization", Chaturvedi et al., IEEE Transactions on GeoScience and Remote Sensing, Vol. 33, No. 3, 1995, Pages 551-561

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toan M Le whose telephone number is (571) 272-2276. The examiner can normally be reached on Monday through Friday from 9:00 A.M. to 5:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Toan Le

September 8, 2005

BRYAN BUI
PRIMARY EXAMINER